**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application.

**Listing of Claims:**

What is claimed is:

1. (Currently Amended) A method of adaptively re-aligning a modulated output signal having a corresponding phase input signal, where said modulated output signal has an error component, said method comprising the steps of:

~~generating reference phase signal using said phase input signal;~~

combining said phase input signal with at least a portion of a carrier wave to generate a reference phase signal;

generating a sample phase signal from said modulated output signal;

comparing said reference phase signal with said sample phase signal; and

adaptively re-aligning any difference between said reference phase signal and said sample phase signal based upon said comparison to substantially reduce said error component.

2. (Original) A method as in claim 1 further comprising:

selecting a carrier frequency channel for said reference phase signal, wherein said sample phase signal incorporates at least a portion of said channel selection.

3. (Original) A method as in claim 2, wherein said channel selection is designated by a number having a fractional part and an integer part, wherein said fractional part is used in generating said reference phase signal.

4. (Original) A method as in claim 1, wherein said modulated output signal is generated by phase and/or frequency modulating said phase input signal with a carrier

signal using a phase modulator.

5. (Original) A method as in claim 4, wherein said phase modulator comprises an equalization filter, an overall modulation response filter, and a wideband phase modulator.

6. (Currently Amended) A method as in claim 1, further comprising the steps of:

quantizing and sampling said modulated output to generate said sample phase input signal;

~~combining said phase input signal with at least a portion of a carrier wave to generate said reference phase signal;~~

comparing said sample phase input signal with said reference phase signal to generate a phase error signal;

passing said phase input signal through a reference error filter to generate reference phase error information;

combining said phase error signal with said reference phase error information to generate a correction signal;

adaptively controlling gain of said correction signal to generate a final estimated error; and

using said final estimated error to re-align said modulated output signal with said phase input signal.

7. (Original) A method as in claim 6, wherein said quantizing of said modulated output signal comprises prescaling and generation of I and Q signals from said modulated output signal.

8. (Original) A method as in claim 7, wherein said modulated output signal is divided by four and digitally sampled to one bit of resolution each for said I and Q signals.

9. (Original) A method as in claim 7, wherein a carrier wave for said I and Q signals is digitally sampled at one bit of resolution.

10. (Original) A method as in claim 6, wherein both rising and falling edges of said modulated output signal may be used to generate two sets of I and Q signals offset by half cycle, which increases the resolution of said sample phase signal to eight phase sectors.

11. (Original) A method as in claim 6, wherein said reference phase signal and said sample phase signal are scaled to a range of .+-.1 and said comparison includes a modulo 2 computation.

12. (Original) A method as in claim 6, further comprising the step of passing said phase input signal through a filter prior to said combining with said carrier wave, wherein said filter has a frequency response calculated based upon an overall modulation response of a phase modulator used to generate said modulated output signal.

13. (Original) A method as in claim 12, wherein said reference error filter has a frequency response calculated based upon an estimation of said frequency response of said phase modulator.

14. (Original) A method as in claim 6, wherein said adaptive gain control is accomplished by using fixed time steps to said final estimated error.

15. (Original) A method as in claim 6, wherein said final estimated error is used to control phase/frequency detector gain of a phase modulator used to generate said modulated output signal.

16. (Currently Amended) An apparatus for adaptively re-aligning a modulated output

signal having a corresponding phase input signal, where said modulated output signal has an error component, said apparatus comprising:

an adaptive re-alignment processor for generating a reference phase signal ~~using said phase input signal~~ by combining said phase input signal with at least a portion of a carrier wave, generating a sample phase signal from said modulated output signal, comparing said reference phase signal with said sample phase signal; and adaptively re-aligning any difference between said reference phase signal and said sample phase signal based upon said comparison to substantially reduce said error component.

17. (Original) An apparatus of claim 16, further comprising:

a carrier frequency generator for generating a carrier frequency channel for said reference phase signal, wherein said sample phase signal incorporates at least a portion of said carrier frequency channel.

18. (Original) An apparatus as in claim 17, wherein said channel selection is designated by a number having a fractional part and an integer part, wherein said fractional part is used in generating said reference phase signal.

19. (Original) An apparatus as in claim 16, wherein said signal processor comprises a phase and/or frequency modulator for modulating said phase input signal with a carrier signal

20. (Original) An apparatus as in claim 19, wherein said phase and/or frequency modulator comprises an equalization filter, an overall modulation response filter, and a wideband phase modulator.

21. (Currently Amended) An apparatus of claim 16, further comprising:

a sampling circuit for quantizing and sampling said modulated output to generate said sample phase input signal;

~~a first combining circuit for combining said phase input signal with at least a portion of said carrier wave to generate said reference phase signal;~~

a comparison circuit for comparing said sample phase signal with said reference phase signal to generate a phase error signal;

a reference filter for receiving said phase input signal and generating reference phase error information;

a ~~second~~ combining circuit for combining said phase error signal with said reference phase error information to generate a correction signal; and

an adaptive gain control circuit for adaptively controlling gain in said correction signal to generate a final estimated error, and for using said final estimated error to re-align said modulated output signal with said phase input signal.

22. (Original) An apparatus as in claim 21, wherein said quantizer circuit comprises a prescaling circuit for prescaling and generation of I and Q signals from said modulated output signal.

23. (Original) An apparatus as in claim 22, wherein said quantizing circuit divides said modulated output signal by four and digitally sampled and quantized to the resolution of eight phase sectors.

24. (Original) An apparatus as in claim 22, wherein said carrier wave for said I and Q signals is digitally sampled at one bit of resolution.

25. (Original) An apparatus as in 24, wherein both rising and falling edges of said modulated output signal may be used to generate two sets of I and Q signals offset by half cycle, which increases the resolution of said sample phase signal to eight phase sectors.

26. (Original) An apparatus as in claim 21, wherein said sample phase signal and said reference phase signal are scaled to a range of .+-.1 and said comparison circuit includes

a modulo 2 computation.

27. (Original) An apparatus as in claim 21, further comprising an input filter for receiving said phase input signal prior to said combining with said carrier wave, wherein said input filter has a frequency response calculated based upon an overall modulation response of said phase and/or frequency modulator.

28. (Original) An apparatus as in of claim 21, wherein said reference error filter has a frequency response calculated based upon an estimation of a frequency response of said phase and/or frequency modulator.

29. (Original) An apparatus as in claim 21, wherein said adaptive gain control of said gain is accomplished by using fixed time steps to adjust gain to achieve a targeted settling time of said final estimated error.

30. (Original) An apparatus as in claim 21, wherein said final estimated error is used to control phase/frequency detector gain of said phase modulator.

31. (Original) An apparatus as in claim 21, wherein said first combining circuit and said comparison circuit comprise a digital phase locked loop.

32. (Currently Amended) An apparatus for adaptively re-aligning a phase portion of an output signal from a phase and/or frequency modulator, wherein a phase input signal is provided to ~~said~~ a phase modulator for modulating a carrier wave to produce said output signal, said apparatus comprising:

a quantizing circuit for quantizing and sampling said output signal to generate a sample phase signal;

a digital phase locked loop for combining said phase input signal with said carrier wave to generate a reference phase signal, and for comparing said sample phase signal with said reference phase signal to generate a phase error signal;

the said phase error signal will be filtered to generate a digital phase locked loop feedback error signal; and

a combining circuit for combining said phase input signal with said feedback error signal to generate a corrected reference phase signal.

33. (Original) An apparatus of claim 32, wherein said quantizer circuit comprises a prescaling circuit for prescaling said output signal and said output phase information includes I,Q data carrier wave information for said output signal.

34. (Original) An apparatus of claim 33, wherein said quantizing circuit divides said output signal by four and digitally samples said output signal to one bit of resolution each for said I,Q data.

35. (Original) An apparatus of claim 33, wherein said carrier wave is digitally sampled at one bit of resolution.

36. (Original) An apparatus of claim 32, wherein said output phase information and said reference modulation information are scaled to a range of .+-.1 and said digital phase locked loop includes a modulo 2 computation of values for said output phase information and said reference modulation information.

37. (Original) An apparatus of claim 32, further comprising an input filter for receiving said input phase prior to said combining with said carrier wave, wherein said input filter has a frequency response calculated based upon an output frequency response of said phase and/or frequency modulator.

38. (Original) An apparatus of claim 32, wherein said reference error filter has a frequency response calculated base upon an estimation of said frequency response of said phase and/or frequency modulator.

39. (Original) An apparatus of claim 32, wherein said adaptive gain control of said gain in said modulation of said carrier wave by said input signal is accomplished by using fixed time steps to adapt gain variance for a targeted settlement time of said correction signal.